

Pesticide Exports from U.S. Ports, 1997–2000

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U.S. Customs records reveal that 3.2 billion pounds of pesticide products were exported in 1997–2000, an average rate of 45 tons per hour. Nearly 65 million pounds of the exported pesticides were either forbidden or severely restricted in the United States; however, no banned pesticide export was recorded for the year 2000. 2.2 million pounds of pesticides regulated under a treaty on persistent organic pollutants (POPs) were exported between 1997 and 1999, with no such export in 2000. Exports of pesticides subject to the prior informed consent (PIC) treaty decreased 97% from the 1997 total of nearly 3 million pounds. Thus, international efforts to reduce the trade in hazardous pesticides may be bearing fruit. However, they are balanced by high rates of export of pesticides designated “extremely hazardous” by the WHO (89 million pounds), pesticides associated with cancer (170 million pounds), and pesticides associated with endocrine disrupting effects (368 million pounds), mostly to developing countries. These findings point in two directions: first, progress is possible, and second, the focus of international efforts should be expanded. From public health and environmental protection perspectives, exports of hazardous pesticides remain unacceptably high. *Key words:* pesticide exports; developing countries; international policy.

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As compounds deliberately created to be harmful to life, pesticides are a special class of man-made chemicals. Although more than half a century has passed since the first explosion of interest in the chemical DDT,¹ many issues relating to the safe management of these substances remain unresolved.

In the 1960s, as governments began to confront the problems resulting from environmental contamination, it became apparent that matters previously considered to be the realm of domestic policy—for example, policies regarding the manufacture and sale of pesticides—could also involve the international community.²

International efforts to improve pesticide safety have focused to a large extent on hazardous practices in developing countries. The first, the International Code of Conduct on the Distribution and Use of Pesticides,

was developed “to address a number of difficulties associated with the use of pesticides in developing countries where adequate regulatory infrastructures are frequently lacking.”³

In recent years, two agreements have been negotiated that are intended to reduce the global burden of hazardous pesticides (and other chemicals). Treaties on prior informed consent (PIC)⁴ and persistent organic pollutants (POPs)⁵ have been signed, and each will enter into force when ratified by 50 signatories.

THE CURRENT OF U.S. POLICY

At present, U.S. law does little to control hazardous pesticide exports. Products considered too harmful for domestic use may be exported, as well as products that have not been registered by EPA.* In addition, the EPA has ruled that banned pesticides may be imported into the United States to be formulated or repackaged for export.⁶

Domestic policy does not address products whose risks may be greatly increased when they are applied without adequate protective equipment, or by untrained applicators—conditions that have long been understood to be prevalent in developing countries.⁷

Ratification of the PIC and POPs instruments would bring changes. But even these positive developments, and the resulting amendment of domestic law, would not in themselves move the United States to truly precautionary policies regarding pesticide exports.⁸

THE PIC AGREEMENT

The PIC agreement establishes a system through which governments can exchange information about chemicals they have found to be dangerous. If governments in at least two PIC regions† ban or severely restrict a chemical, a committee reviews the data supporting these decisions and decides whether or not the chemical is a candidate for PIC.

If the pesticide (or other chemical) meets the criteria outlined in the PIC convention, a decision guidance

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*See section 136a of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) for a description of the registration process. EPA conducts no independent testing of pesticide safety, but reviews information provided by industry.

† The PIC regions are: Africa (48 countries), Latin America and the Caribbean (33 countries), Asia (23 countries), Near East (22 countries), Europe (49 countries), North America (Canada and the United States), and Southwest Pacific (16 countries).

document (DGD) is drafted and circulated to the designated national authority (DNA) in each participating country. Based on the information in the DGD, the DNA can determine whether to allow continued imports.

A developing country may request that a pesticide be included on the PIC list if it has been found to cause health or environmental problems under conditions of use. Details relating to the type of information required to support such a request, or the standards for decisions, are still being discussed.⁹

Inclusion on the PIC list has at times been described as a "worldwide ban," but in reality it does not automatically bring a chemical out of circulation. Even after the treaty enters into force, production or trade by non-parties may continue. Parties may decide that they want to continue to import chemicals on the PIC list.

Products whose risks have not been evaluated by the U.S. Environmental Protection Agency (EPA) may be manufactured for export. They are often produced for use in developing countries, where it is less likely that adverse effects that would call for them to be added to the PIC list will be discovered.¹⁰ In a survey conducted by the Food and Agricultural Organization of the United Nations, 89% of the respondents from developing countries observed that the fates and environmental effects of pesticides either were not studied at all or were only partly studied in their countries.¹¹

PERSISTENT ORGANIC POLLUTANTS

The particular aim of the POPs treaty is the elimination of toxic chemicals that are known to persist in the environment and to accumulate in air, soil, water, and the food chain. Seven of the nine pesticides currently identified as POPs† are also included among the 26 pesticides on the PIC list.

Signatories to this treaty agree to halt production and use of pesticides that have been named to the POPs list. However, they may seek exemptions that allow continued production and use. While media attention has focused on debate over the continued use of DDT in malaria prevention, some countries have also requested exemptions for specific applications of chlordane, heptachlor, mirex, aldrin, and toxaphene.¹² (China has also expressed a need to continue production of chlordane and mirex for use as termiticides.¹²)

The hazards of the pesticides currently on the POPs list have been established for decades; they are all organochlorine products, and in that respect are "old technology." Crop Life International (formerly the Global Crop Protection Federation) has stated that none of its "R & D company members" is producing POPs pesticides.¹³

†POPs pesticides include aldrin, dieldrin, endrin, heptachlor, chlordane, DDT, mirex, toxaphene, and hexachlorobenzene. See: <<http://irptc.unep.ch/pops/>>.

EVALUATING HAZARDOUS EXPORTS: THE FASE PROJECT

The general scarcity of precise, up-to-date information about production, trade, and use of pesticides is a serious impediment to the efforts of policymakers attempting to protect public health and the environment. International regulatory efforts can consume decades; in view of this reality, an accurate picture of the global "dose" of a suspect chemical is an essential first step.

Unfortunately, exact details relating to production and trade are generally allowed the status of "confidential business information." It remains to be seen how this dynamic will evolve when agreements such as those for PIC and POPs enter into force, and researchers, public interest groups, policymakers, inter-governmental agencies, and others want—or need—to know whether the global burden of dangerous toxics is actually decreasing.

In 1991, the Foundation for Advancements in Science and Education (FASE) began a project intended to document the volume of trade in hazardous pesticides. The U.S. EPA has no mandate to collect comprehensive data on pesticide exports, and does not have permission from the Department of Commerce to access the information in export declarations.¹⁴ As a result, it became apparent that commercial transcriptions of U.S. Customs shipping records were the most comprehensive source of export information available in the public record.§

Despite significant data gaps (for example, the specific compounds shipped could be determined for only 25% of the shipments studied), a review of three months of records for 1990 found that extremely toxic and U.S.-banned pesticides were being exported at a rate of nearly 60 tons per day.¹⁵

A FASE survey of 1991 pesticide exports found that this rate had increased to 80 tons per day.¹⁶ Again, the identities of about three fourths of the compounds exported could not be readily determined. A review of exports during the three-year period between 1992 and 1994 found at least 25 million pounds of domestically banned pesticides¹⁷; a subsequent survey of exports in 1995 and 1996 showed exports of at least 21 million pounds of pesticide products forbidden to be used in the United States.¹⁸

Before discussing the most recent findings, it is worthwhile to underscore several points. The figures

§The figures cited in this paper are derived from analysis of shipping documents transcribed by the Port Import Export Retrieval Service (PIERS) of the Journal of Commerce. They do not account for shipments via truck or rail. The fact that a product is exported from a U.S. port does not necessarily mean that the product was manufactured in the United States. It should also be noted that in many instances the data provided in publicly-accessible records of individual shipments are incomplete, omitting vital information such as the specific name of the product being exported or the quantity exported in that shipment. In most cases, records do not state whether the product shipped is a technical-grade product or a formulation.

TABLE 1 Exports, All Products

	1997	1998	1999	2000
	786,539,011	812,023,905	831,256,647	761,891,303

presented in this paper must be understood as the best estimates possible given the limitations of public-record information, and the current predilection for restricting public access to such data. As discussed in earlier reports, many shippers have requested that their names be omitted from the transcriptions used in this work. Over the ten-year period that data were collected, the shippers' names were omitted from records for almost half of all shipments, trade representing more than 3 billion pounds of chemicals.

The exact business addresses of the shippers are often omitted as well, though it is possible to say that at least 90%—and possibly as many as 96%—of the shippers have business addresses in the United States. Nothing in the records indicates whether a shipper is also the manufacturer.¶

It was possible to identify the specific compounds shipped for 46% of the shipments during this period (by volume). Descriptions for the remaining 54% ranged from “organophosphate pesticide” to “weed killing compound,” in addition to ambiguous chemical descriptions, truncated UN shipping code numbers, and other baffling terminology. In view of this, it would not be unfair to insert the preface “at least” before most of the following figures.

FINDINGS

According to Customs records nearly 3.2 billion pounds of pesticide products were exported between 1997 and 2000. This is an average rate of nearly 2.2 million pounds per day, or 45 tons per hour. This average rate is a 15 percent increase over the rate of 936 tons per day reported for 1992–1996⁸ (Table 1). According to Customs records, glyphosate accounts for between 22 and 27 percent of *all* pesticide exports in the years studied—a rate significantly higher than any other chemical. Although glyphosate is among the “new” generation of pesticides with lower toxicity and less per-

sistence, recent research has raised the possibility that exposure to glyphosate can increase the risk for developing non-Hodgkin's lymphoma.¹⁹ The high rate of export is also of interest in view of the fact that some glyphosate products are teamed with seeds engineered to be resistant to the chemical, with the idea that this combination will *reduce* pesticide use.**

Domestically Forbidden Products

According to Customs records, nearly 65 million pounds of the pesticides exported between 1997 and 2000 were either forbidden or severely restricted in the United States, amounting to an average of more than 22 tons per day (Table 2).

By the year 2000, no instance of the export of any such banned products was recorded. In the 1997–1999 period, shipments of several banned pesticides²¹ were found in Customs records: captafol (24.6 tons total), chlordane (4.2 tons), edb (104 tons), isazofos (196 tons), mercury-based pesticides (9 tons), mevinphos (37.7 tons), mirex (1084 tons), monocrotophos (714 tons), ompa (21 tons), silvex (21.5 tons), and sodium penta (205 tons).

Fifty-seven percent of these products were shipped to destinations in the developing world. Nearly half of the remaining 43% were shipped to ports in Belgium and the Netherlands. Though it is not possible to make a final determination from available data, it is likely that the final destinations of a large number of these shipments were also in developing countries.

Products that have never been registered in the United States were exported at an average rate of 16 tons per day during the four years examined. As noted in earlier reports, the total for such products could be much larger. The largest-volume chemicals exported were butachlor (nearly 14 million pounds total) and carbosulfan (10.2 million pounds).

A recent field study examined how one unregistered product, cadusafos, was treated by regulators in Honduras. The chemical was registered on the basis of communications from the EPA stating that cadusafos was “registered” under Section 7 of FIFRA (Section 7 requires producers to provide production figures), and that tolerances for residues on food had been established. Further

¶In this context, it should be stated again that EPA has ruled that banned chemicals may be imported into the United States to be repackaged for export.

**Glyphosate has also gained notoriety recently due to its use in drug eradication efforts in South America. For example, see Higgins.²⁰

TABLE 2 Banned, Severely Restricted, and Never-registered Pesticides

	1997	1998	1999	2000
Banned	2,319,126	1,453,776	1,069,556	0
Severely restricted	7,576,935	4,420,205	3,149,300	4,650,482
Never registered	10,522,303	7,169,132	11,311,960	11,231,044
TOTAL	20,418,364	13,043,113	15,530,816	15,881,526

TABLE 3 UN Class 1a Exports (Selected Products)*

	1997	1998	1999	2000
Acrolein	265,228	86,720	136,135	34,382
Aldicarb	4,668,251	4,865,105	6,484,907	8,857,926
Disulfoton	546,452	198,291	1,606,182	547,911
Ethoprop	711,870	1,766,177	1,252,059	1,162,106
Methyl parathion	9,321	2,398	180,028	0
Phorate	473,314	766,422	297,330	512,718
Terbufos	1,313,848	2,153,623	397,435	372,461

*Source: International Program on Chemical Safety: The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, 1996–1997, 1998–1999, 2000–2001.

TABLE 4 Class I Pesticide Exports (High-volume Products)

	1997	1998	1999	2000
Carbofuran	5,729,747	3,778,159	2,955,656	4,552,747
Carbosulfan	2,690,579	2,486,644	2,412,297	2,582,802
Copper hydroxide	3,833,490	3,790,794	6,194,697	5,809,102
Methamidophos	1,767,530	444,850	184,562	87,837
Methomyl	4,941,473	4,085,919	3,547,615	3,293,336
Oxamyl	649,229	1,424,868	602,058	614,584
Paraquat	1,127,554	4,070,973	3,854,264	2,665,934
Propachlor	1,428,780	517,950	974,163	746,046
Propargite	1,128,358	357,379	121,655	412,201

examination underscored the fact that the resources necessary to evaluate the safety of a never-registered product did not exist in the country. “There is no reason to believe that these grave shortcomings are unique to Honduras among the Central American States,” the author notes. “On the contrary, these flaws appear to be the status quo in the region.”¹⁰ (Nearly 678 tons of cadusafos were exported between 1997 and 2000.)

Highly Toxic Exports

In the four-year period studied, at least 89,395,597 pounds of pesticides were exported that have been designated “extremely hazardous” (Class 1a) by the World Health Organization^{††} (Table 3). This is an average rate of more than 30 tons per day. Among the most toxic of these is aldicarb, which has an oral toxicity (LD₅₀) of less than 1 mg/kg body weight. Total exports in 2000 were almost 90% more than the 1997 total, increasing from 4.7 million pounds to 8.9 million pounds. Over the four-year period, the average rate of export was just over 8.5 tons per day.

The following is a description of the personal protective equipment recommended for workers applying aldicarb: “Coveralls over short-sleeved shirt and short pants; Waterproof gloves; Chemical-resistant footwear plus socks; Protective eyewear; Chemical-resistant apron

when cleaning equipment, mixing, or loading; Chemical-resistant headgear for overhead exposure; Approved respirator.”²¹ More than 70% of aldicarb exports were destined for developing countries—including El Salvador, Peru, Argentina, Brazil, Guatemala, and Colombia—where it is extremely unlikely that this level of protection would be available to applicators.

In the system utilized by the U.S. EPA, the highest toxicity rating is “Class I,” which is roughly equivalent to combining the UN classes 1a (extremely hazardous) and 1b (highly hazardous).^{††}²² Total exports for these products are significantly higher than “1a” exports alone, a total of 140,202,845 pounds for the four-year period (Table 4). This is an average rate of just over two tons per hour.

Restricted-use Products

In the United States, “restricted use” pesticides (RUPs) may be purchased and used only by state-certified applicators or persons working under their direct supervision because of their toxicity and/or environmental hazards.²³ However, the FAO found that pesticide traders advertise restricted use pesticides to the general public in nearly two-thirds of Latin American countries.¹¹

Total exports of RUPs over the four-year period examined amounted to 284,590,511 pounds, an average rate of four tons per hour (Table 5). Total exports

††See International Program on Chemical Safety: The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, 1996–1997, 1998–1999, 2000–2001. As noted in these publications, final determination of a classification depends on the pesticide formulation. This level of detail is not always provided in publicly accessible records.

TABLE 5 Restricted-use Pesticide Exports, Yearly Totals

1997	1998	1999	2000
70,253,301	75,210,896	75,692,921	63,433,393

TABLE 6 Restricted-use Pesticide Exports (High-volume Compounds)

	1997	1998	1999	2000
Acetochlor	12,544,708	13,447,422	18,463,619	9,489,135
Alachlor	12,682,496	15,420,735	13,037,018	7,571,781
Atrazine	1,709,296	722,213	1,583,367	3,256,031
Chlorothalonil	10,112,203	9,469,986	7,202,013	7,030,966
Chlorpyrifos	9,612,313	9,453,163	7,919,491	8,570,694
Methyl bromide	989,948	1,473,341	1,726,483	2,335,977

TABLE 7 Exports of Known Carcinogens, 1997–2000*

	1997	1998	1999	2000
Acetochlor	12,544,708	13,447,422	18,463,619	9,489,135
Acifluoren	245,823	516,385	322,393	596,920
Alachlor	12,682,496	15,420,735	13,037,018	7,571,781
Beryllium nitrate	500	0	0	0
Captafol	47,421	800	1,000	0
Captan	1,957,948	1,476,510	1,521,751	2,840,977
Chlordane	0	0	8,370	0
Chlorothalonil	10,112,203	9,469,986	7,202,013	7,030,966
Diuron	1,665,030	758,788	415,708	289,022
Folpet	0	653	5,174	921
Iprodione	3,104	100	250	0
Isoxaflutole	41,721	0	34,030	50,271
Lindane	28,775	29,352	9,082	0
Mancozeb	3,230,275	1,194,982	455,412	2,170,070
Maneb	650,385	129,785	265	89,724
Mirex	842,366	768,977	555,704	0
Oxadiazon	0	0	0	17,900
Procymidone	25,679	0	0	0
Propachlor	1,428,780	517,950	974,163	746,046
Propargite	1,128,358	357,379	121,655	412,201
Thiodicarb	807,869	1,458,993	477,874	2,059,520
TOTAL	47,443,441	45,548,797	43,605,481	33,365,454

*Source: State of California Environmental Protection Agency.²⁶

in 2000 were more than 6 million pounds less than in 1997. Among the restricted-use compounds exported in high volume (see Table 6), methyl bromide is notable, in that 2000 exports appear to have been 68% higher than 1997 exports. This increase is at odds with the general trend of decreasing exports of RUPs—and out of step with both global concerns regarding the ozone-depleting properties of this chemical²⁴ and the U.S. EPA's plans for an accelerated phaseout of domestic production, importation, and use.²⁵

ADVERSE HEALTH EFFECTS

Cancer

Between 1996 and 2000, nearly 1.1 billion pounds of pesticides were exported that have been identified as known or suspected carcinogens.^{26–28} This is an average rate of almost 16 tons per hour.

Proposition 65, an initiative approved by California voters, requires the governor to publish a list of chemicals that are known to the State of California to cause

cancer, birth defects, or other reproductive harm. This list is admittedly more precautionary (and inclusive) than the list generated by the U.S. EPA; nonetheless, it draws attention to a group of chemicals that might be encompassed by proactive export policies. A total of 166,834,625 pounds of pesticides that are noted as “known carcinogens” on the most recent list²⁶ were identified in shipping records for the period between 1997 and 2000, an average export rate of nearly 2.4 tons per hour (Table 7).

These figures have particular import in regard to children in developing countries. According to the International Labor Organization, 65 to 90% of the children estimated to be working in Africa (80 million total), Asia (152 million) and Latin America (17 million) are working in agriculture.²⁹ Evidence that children have heightened susceptibility to the carcinogenic effects of pesticides^{30,31} has even greater significance for developing countries. There, children live and work in conditions that involve almost continuous exposure, ranging from contact in fields to contaminated water, pesticide-contaminated clothing, and storage of pesticides in homes.^{32,33}

TABLE 8 Exports of Pesticides of “High Exposure Concern” for Endocrine-disrupting Effects

	1997	1998	1999	2000
Acetochlor	12,544,708	13,447,422	18,463,619	9,489,135
Alachlor	12,682,496	15,420,735	13,037,018	7,571,781
Atrazine	1,709,296	722,213	1,583,367	3,256,031
Linuron	28,866	31,990	51,329	39,480
Maneb	650,385	129,785	265	89,724
Mirex	842,366	768,977	555,704	0
Thiram	937,038	2,088,362	458,444	1,186,012
Tributyltin	37,655	75,312	0	0
Zineb	0	0	203,178	0
TOTAL	29,432,810	32,684,796	34,352,924	21,632,163

Endocrine Disruption

Over the last decade, a growing body of evidence has accumulated that the transfer of residues of certain pesticides (and other chemicals) from a pregnant woman to the fetus can interfere with the hormonal signals directing fetal development.³⁴ One of the most troubling aspects of this research is the indication that such exposures can have long-term effects at levels as low as parts per billion.³⁵

The 1996 Food Quality Protection Act and the 1996 Amendments to the Safe Drinking Water Act required the EPA to establish a screening and testing program for endocrine-disrupting chemicals.³⁶ The Endocrine Disruptors Screening and Testing Advisory Committee was created to advise the EPA on a strategy to screen and test chemicals, including pesticides, for their potential to disrupt endocrine functions. No policy change has been suggested yet regarding the export of pesticides and other chemicals associated with these effects.

Between 1997 and 2000, a total of 367,899,627 pounds of pesticides associated with endocrine-disrupting effects^{37,38} were identified in Customs records. This is an average rate of 126 tons per day. (As a point of reference, one “part per billion” of this total would be about 37 pounds—a quantity exported five times each second during the four years studied.) Exports recorded at the end of the four-year period (84.7 million pounds) had decreased 9% from the 1997 total of 93 million pounds.

To guide its policy efforts regarding endocrine disrupting chemicals, the European Commission commissioned a study to establish a list of substances that should have priority for further evaluation. During the four years in question, more than 118 million pounds of pesticides were exported that are included in the EC’s “high exposure concern” category (Table 8); two (mirex and tributyltin) are highly bioaccumulative.³⁷

As discussed above, there is great concern about the potential impact of endocrine-disrupting chemicals on the developing fetus. As developing countries have moved toward export-oriented, mechanized farming, permanent workers have been replaced by seasonal, non-permanent workers—and women have come to represent a large per-

centage of this non-permanent workforce.³⁹ As a result, “women have been noted to do less organized work, applying pesticide by hand, while mechanical or backpack sprayers are used only by the more skilled male permanent workers.”³⁹ Thus, the population that should be most protected from exposure to endocrine-disrupting effects is placed in greatest jeopardy.

The majority of the shipments of compounds associated with endocrine disruption were to developing countries, perhaps two thirds or more (Table 9). (Estimation is made difficult by the fact that the final destinations of more than 23 million pounds of these pesticides are recorded as Belgium or The Netherlands—apparently transshipment ports.)

PIC AND POPS CHEMICALS

Exports of two POPs chemicals (chlordane and mirex) were recorded between 1997 and 1999. None was found in 2000, the year in which the POPs negotiations were concluded. A single shipment of chlordane (8,370 pounds) to Puerto Rico was found in the records for 1999, with the contents described as “chlordane toxic liquid waste.”

Shipments of mirex were recorded in 1997 (842,366 pounds), 1998 (768,977 pounds), and 1999 (564,074 pounds). Primary destinations of these shipments included Japan, the Korean Republic, Belgium, and The Netherlands. (It is most likely that the ports in the latter two countries, which together account for 42% of the three-year total, were transshipment destinations.)

TABLE 9 Exports of Pesticides Associated with Endocrine Disruption, 2000*

	Millions of pounds
Argentina	8,382,289
Brazil	10,467,793
China	1,548,387
Colombia	2,469,084
Guatemala	2,152,034
Korean Republic	2,220,095
Philippine Republic	1,922,146
Thailand	1,853,784

*To developing countries receiving more than 1 million pounds.

TABLE 10 Exports of PIC Pesticides

	1997	1998	1999	2000
Captafol	47,421	800	1,000	0
Chlordane	0	0	8,370	0
Lindane	28,775	29,352	9,082	0
Mercury compounds	8,292	7,308	2,436	0
Methamidophos	1,767,530	444,850	184,562	87,837
Methyl parathion	9,321	2,398	180,028	0
Monocrotophos	1,126,087	239,942	64,107	0
Parathion	0	40,944	0	9,898
TOTAL	2,987,426	765,594	449,585	97,735

The highly toxic organochlorine pesticide endosulfan has been mentioned as a likely candidate for the POPs list. The United Nations Division for Sustainable Development includes endosulfan in a core list of contaminants of whole milk, butter, animal fats and oils, fish, cereals, and human milk—along with DDT, aldrin, dieldrin, heptachlor, PCBs, and other notoriously persistent chemicals.⁴⁰

Endosulfan has also been linked to worker fatalities; official sources in Benin reported 70 deaths from endosulfan poisoning in the Borgou province during the 1999–2000 season.⁴¹

A total of 327,051 pounds of endosulfan were exported between 1997 and 2000, an average rate of 0.8 tons per week. Total exports for 1999 (153,559 pounds) and 2000 (117,633 pounds) were significantly higher than for 1997 (14,504 pounds) and 1998 (42,355 pounds). The largest quantities went to Mexico (140,290 pounds) and Guatemala (76,266 pounds). Other destinations included Guyana, Honduras, Costa Rica, El Salvador, Peru, Panama, and Vietnam.

During the four years examined, exports of pesticides subject to the PIC procedure decreased dramatically, with the 2000 figure 97% lower than the 1997 figure (Table 10). (The PIC agreement was adopted in September 1998.) Until the PIC treaty is ratified by 50 nations, it is not legally binding on the parties. The United States has not yet ratified the PIC agreement, and no change has been made in U.S. law in relation to the PIC procedure. However, Parties to the agreement are presently committed to voluntary compliance with the agreement.

Virtually all of the shipments of PIC pesticides were to countries that have notified the PIC Secretariat that they want to continue to import the chemical in question. However, three shipments were found that seem to have fallen through the cracks of the voluntary procedure.

- Customs records note that shipper “Econo Caribe,” based in Miami, shipped 577 pounds of lindane from Point Everglades to Honduras on February 27, 1998.⁴² Honduras had filed a notification that it would not import this chemical with the PIC Secretariat on November 3, 1997.

- The Philippines filed a notice with the PIC Secretariat on April 23, 1997, that it did not consent to methamidophos imports.⁴² The first shipment noted (11,023 pounds) was shipped from Long Beach by “Direct Container Line,” based in Miami, on August 26, 1998. The second (29,376 pounds) was shipped from Los Angeles by Ocean World Lines, based in New York, on March 30, 1999. (Note: This product is on the PIC list as a “severely hazardous pesticide formulation.” The 1999 shipment is described as technical grade; no details regarding the exact formulation of the 1998 shipment are provided.)

These shipments do not constitute violation of any binding agreement or domestic law. Whatever the particulars may be, they are overshadowed by the dramatic reduction in exports of PIC chemicals from U.S. ports.

“FORGOTTEN POLLINATORS”

Animals and insects pollinate over three fourths of the staple crop plants that feed humankind and 90% of all flowering plants in the world. The economic value of animal pollination to world agriculture has been estimated to be \$200 billion per year.⁴³ Honeybees, the most economically important crop pollinators worldwide, are in decline. It has been estimated that at least 20% of all losses of honeybee colonies involve some degree of pesticide exposure.⁴⁴

One fourth of all managed honeybee colonies were lost between 1990 and 1995, an event described as “one of the most severe declines in any agricultural input that U.S. agriculture has ever experienced.”⁴⁵ One recent effort to assess the consequences of such losses concluded, “serious problems for world food supply, security, and trade could be in the offing if current declines in pollinator abundance, diversity, and availability are not reversed.”⁴⁶

According to Customs records, more than 155 million pounds of pesticides considered to be “highly toxic” to bees were exported. This is an average rate of more than 2.2 tons per hour for the four-year period. Compounds exported in high volume include aldicarb (24.8 million pounds), carbaryl (13.9 million pounds),

carbofuran (17 million pounds), carbosulfan (10 million pounds), chlorpyrifos (35.5 million pounds), diazinon (5.8 million pounds), methomyl (15.8 million pounds), and paraquat (11.7 million pounds).

RECOMMENDATIONS

The evidence from Customs records suggests that efforts by the international community to reduce the trade in hazardous pesticides are bearing fruit. The fact that no export of any banned product was recorded in 2000 is particularly encouraging.

On the other hand, from a public health or environmental protection perspective, exports of hazardous pesticides—including extremely toxic pesticides, and products associated with cancer and endocrine-disrupting effects—remain unacceptably high.

These findings point in two directions: first, progress is possible, and second, expanding the focus of international efforts could yield similarly positive results. Changes in both perspective and policy are needed:

There can be no “double standard” for protecting health and the environment. Export of banned pesticides should be prohibited, as should exports of pesticides that the EPA has never registered. If the EPA does not have certainty that a product poses no unreasonable risk, it should not be exported.††

Exporting countries should assume a proactive, precautionary stance in regard to pesticides. A suspect chemical can remain in use for decades before it is banned. Decades can also pass before epidemiologic studies confirm the poisonings that can be predicted when highly toxic pesticides are used in developing countries.

Whatever the limits of law might be, ethical responsibility for hazardous exports cannot end at our borders. Congress must ensure that the EPA has the resources to fully evaluate the hazards posed by pesticides leaving the United States, and the authority to act on its findings.

The quality and quantity of information regarding pesticide production, trade, and use must be improved. Accurate information will be necessary to monitor compliance with the PIC and POPs agreements. In the absence of complete information about trade and production, government officials, public interest groups, researchers, and others cannot identify the principal targets for risk reduction or regulation.

A system for electronic filing of export declarations (the Automated Export System or AES) already exists in the United States, though it is not mandatory for shippers of products such as agricultural chemicals to use it. The AES should be implemented for shipments

of pesticides, and the EPA should have full access to the data. Details such as chemical identities, quantities exported, and countries of destination should be a matter of public record.

Hazardous pesticides should be phased out when safer alternatives exist. A “substitution principle” enacted in Swedish legislation forbids the use of chemical products for which less hazardous substitutes are available. Under such a scheme, if a new pesticide is registered that is safer than an older one, the older one automatically loses its registration. Implementing such a system domestically would have far-ranging effects on exports, particularly if the export of unregistered products were prohibited.

Aggressive efforts should be made to implement alternatives to chemical-intensive agriculture. A recent report from the World Resources Institute raises serious questions about the likelihood that ecosystem-damaging practices such as pesticide-intensive agriculture offer a long-range means to feed the world.⁴⁷

In cases where pesticide use cannot be eliminated altogether, integrated pest management (IPM) strategies can dramatically reduce pesticide use. While biotechnology is sometimes characterized as “IPM,” field-based programs have pointed to more cost-effective solutions that could be broadly implemented in developing countries.⁴⁸

It has been a quarter of a century since the international community began to address the problem of continued use of banned and extremely hazardous pesticides in developing countries. The PIC and POPs agreements are the most significant steps that have been taken to date, but the realization of their promise depends on the determination of exporting countries to protect workers and the environment in developing countries as if they were their own.

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††Part of the rationale for not registering export-only products is that the conditions of use cannot be duplicated in this country. It is not likely that sale would commence without testing, however—and it is hard to accept that no scientist in this country could interpret the results.

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